AMENDMENTS TO THE SPECIFICATION

The paragraphs below have been amended in the manner required by 37 C.F.R. §1.121, showing all changes (i.e., with the additions underlined and the deleted portions stricken through).

A. IN VARIOUS PARAGRAPHS OF THE SPECIFICATION

Please amend the following ***paragraphs*** of the application to read as follows.

PAGES 1-2: Please amend paragraph [05] spanning pages 1 and 2 as directed below.

[05] MR imaging and spectroscopic procedures are performed in what is known as an MR suite. As shown in Figure 1A, an MR suite typically has three rooms: a scanner room 1, a control room 2, and an equipment room 3. The scanner room 1 houses the MR scanner 10 into which a patient is moved via a slideable table 11 to undergo a scanning procedure, and the control room 2 contains a computer console 20 from which the operator controls the overall operation of the MR system. In addition to a door 4, a window 5 is typically set in the wall separating the scanner and control rooms to allow the operator to observe the patient during such procedures. The equipment room 3 contains the various subsystems necessary to operate the MR system. The equipment includes a power gradient controller 31, a radio frequency (RF) assembly 32, a spectrometer 33, and a cooling subsystem 34 with which to avoid the build up of heat which, if left unaddressed, could otherwise interfere with the overall performance of the MR system. These subsystems are typically housed in separate cabinets, and are supplied electricity through a power distribution panel 12 as are the scanner 10 and the slideable patient table 11. <u>The scanner room 1 is shielded to prevent the entry and exit of electromagnetic waves. Specifically, the materials and design of its ceiling, floor, walls, door, and window effectively form a barrier or shield 6 that prevents the electromagnetic signals generated during a scanning procedure (e.g., the RF energy) from leaking out of scanner room 1. Likewise, shield 6 is designed to prevent external electromagnetic noise from leaking into the scanner room 1.</u>

PAGE 12: Please amend paragraphs [32]-[37] and [42] as directed below.

[32] **Figures 2A and 2B** ~~**Figure 2** is~~ illustrate a schematic circuit diagram for a presently preferred embodiment of a receive-only tapered birdcage resonator, or Head Coil section, for a Neurovascular Array.

[33] **Figure 3** is a top perspective view of a working model of the tapered birdcage resonator shown schematically in ~~Figure 2~~ Figures 2A-2B.

[34] **Figure 4** is a bottom perspective view of a working model of the tapered birdcage resonator shown schematically in ~~Figure 2~~ Figures 2A-2B.

[35] **Figure 5** is a right side perspective view of a working model of the tapered birdcage resonator shown schematically in ~~Figure 2~~ Figures 2A-2B.

[36] **Figure 6** is a left side perspective view of a working model of the tapered birdcage resonator shown schematically in ~~Figure 2~~ Figures 2A-2B.

[37] **Figure 7** is a superior-end perspective view of a working model of the tapered birdcage resonator shown schematically in ~~Figure 2~~ Figures 2A-2B.

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[42] **Figure 12** is an isometric view of a preferred embodiment of a Neurovascular Array, inclusive of the Head Coil section of Figures ~~2-7~~ 2A-7, the Anterior Neck Coil section of Figure 8, the Posterior Cervical Spine Coil section of Figure 9, and a Base section.

PAGE 14: Please amend paragraph [53] as directed below.

[53] Figures 2A-2B illustrate ~~Figure 2 is~~ a schematic diagram for a presently preferred embodiment of a tapered birdcage resonator, or Head Coil section 1000, for a Neurovascular Array (NVA), showing the circuit components and their respective values. The head coil 1000 shown in ~~Figure 2~~ Figures 2A-2B is a "receive only" resonator, i.e., it does not apply the RF excitation pulses. It may, however, be configured to operate as a transmit/receive (T/R) coil. When configured as a receive only resonator, the head coil 1000 shall be used with an external transmit coil, such as the RF body coil of the host MR system.

PAGES 15-17: Please amend paragraphs [57]-[61] as directed below.

[57] Each passive network 1151-1158 comprises a diode network DN in series with a variable inductor L1, both of which in parallel with a capacitor C1. The values of variable inductor L1 and capacitor C1 are shown in ~~Figure 2~~ Figures 2A-2B for each passive network. Each diode network DN preferably contains four diodes of equal rating in parallel, with two of those diodes pointed in one direction and the other two diodes pointed in the opposite direction. Two such diodes in each direction provide parallel current paths to avoid the likelihood of burnout that could otherwise occur if only one such diode were used. Alternatively, one diode of a higher rating in each direction could be used. During the receive cycle of the host MR system, each diode network DN exhibits a high impedance, thereby effectively placing its corresponding variable inductor L1 in an open circuit. Consequently, in each of the passive networks 1151-1158, only the capacitor C1 is seen during the receive cycles.

[58] Each conductive rod A-H also includes a tuning circuit 1161-1168 in series with its corresponding passive decoupling network 1151-1158. Each tuning circuit includes a variable capacitor CV and a fixed capacitor CF. As is well known in the art, the head coil 1000 can be tuned to optimize operation by varying the capacitance in the rods A-H via variable capacitor CV. As shown in ~~Figure 2~~ Figures 2A-2B, the total adjustable range of capacitance in each of the rods is 83-98 pF. Therefore, if CF is 82 pF then the range of variable capacitor CV in parallel with CF would be 1-16 pF, as shown in ~~Figure 2~~ Figures 2A-2B.

[59] The small end ring 1102 provides an impedance matching function in addition to affecting resonance for the four operating modes of head coil 1000 as described below. Specifically, each active decoupling network 1111-1114 comprises a capacitor C2, a PIN diode D1, a variable inductor L1, and an associated port connector J1. Optionally, if separate preamplifiers are used (instead of the preamplifiers of the host MR system), each active network 1111-1114 may include an alternative matching circuit comprised of delay line/trap DL2 and its parallel capacitor C_M, as shown in ~~Figure 2~~ Figures 2A-2B. Each such matching circuit will provide a proper impedance match

between its associated active network and the corresponding preamplifier with which it is used to interface with the host MR system.

[60] If the preamplifiers of the MR system are used, however, the alternative matching circuits would not be required, and the shield and center conductors of each port connector J1 would merely connect to the cathode and anode, respectively, of its corresponding PIN diode D1. The capacitor C2 of each active network lies in series within the small end ring 1102. Each of the four capacitors C2 are selected, at least in part, to achieve a proper impedance match with its corresponding channel in the host 8-channel MR system. The value of capacitor C2 for each of the active decoupling networks 1111-1114 is shown in ~~Figure 2~~ Figures 2A-2B.

[61] The small end ring 1102 also contains other capacitors. For example, for the section of end ring 1102 to which active network 1111 is connected, there are two other capacitors besides capacitor C2, all three of which connected in series between rods A and H. For the section of end ring 1102 to which active network 1112 is connected, there are two other capacitor networks in series with capacitor C2 between rods B and C. For the section of end ring 1102 that accommodates active network 1113, there are two other capacitors in series with capacitor C2 between rods D and E. Similarly, for the section of end ring 1102 that contains active network 1114, there are two other capacitors in series with capacitor C2 between rods F and G. For the other four sections of end ring 1102 (i.e., between rods A & B, C & D, E & F and G & H), one capacitor spans the two adjacent rods. As is known in the art, these other capacitors are selected so as to achieve resonance for the four operating modes of head coil 1000 as described hereinafter. The values of these capacitors are shown in ~~Figure 2~~ Figures 2A-2B.

PAGE 18: Please amend paragraph [64] as directed below.

[64] The large end ring 1101 also affects resonance for the four operating modes of head coil 1000. Unlike the design for the first embodiment of the head coil, there are variances in the values of the capacitors within the inferior end ring 1101 of head coil 1000. The values of these capacitors are shown in ~~Figure 2~~ <u>Figures 2A-2B</u>. The different capacitive values are used to accommodate the different lengths in the sections of the end ring 1101 between adjacent rods, as best shown in Figures 3-7. Due the desire to make room for the nose, the section of ring 1101 between rods B & C, for example, is longer than the section opposite it, namely, the section between rods F & G. Similarly, the section of ring 1101 between rods A & B is longer than the adjacent section between A & H. Each of the different capacitive values provides a capacitive reactance that accommodates the different inherent inductances of the the respective sections of the conductive end ring 1101. This compensation scheme was implemented in the large and small end rings because the length of the rods were chosen to have the same reactive length. Furthermore, as can be seen in Figures 3-7 in view of ~~Figure 2~~ <u>Figures 2A-2B</u>, the longer sections of ring 1101 (i.e., between rods B & C, D & E, F & G and H and A) have two capacitors rather than one for purposes of diminishing the electric field. This arrangement prevents the head coil from being loaded unnecessarily high at the inferior end near the shoulders, and thus avoids a reduction in the overall sensitivity of the head coil 1000. This minimizes the electric field patient coupling to the coil.

PAGE 19: Please amend paragraph [67] as directed below.

[67] The operation of head coil 1000, in this preferred embodiment, is now described. During the transmit cycle (i.e., when the RF body coil is transmitting), the host MR system turns on each of the active and passive decoupling networks. Regarding the active decoupling networks 1111-1114, the host MR system sends a bias signal (e.g., 250 mA) to each of the PIN diodes D1, thus placing them in a state of forward conduction. This leaves capacitor ~~C1~~ C2 and variable inductor L1 in parallel, with the equal capacitive and inductive reactances giving rise to a parallel resonant circuit across the drive point. The resulting high impedance effectively open circuits the corresponding portion of the small end ring 1102, thus decoupling the head coil from the host MR system. Regarding the passive decoupling networks 1151-1158, the RF signal transmitted by the RF body coil turns on each passive network. The diode networks DN each respond to the RF signal by effectively short circuiting, thus yielding a parallel resonant circuit consisting of capacitor C1 and inductor L1. The resulting high impedance effectively open circuits each of the rods A-H.

PAGE 23: Please amend paragraphs [75] and [76] as directed below.

[75] It should also be understood that a preamplifier may optionally be added to each of the active decoupling networks 1111-1114, in which case an alternative matching circuit comprised of delay line/trap DL2 and its parallel capacitor C_M would be needed in each active network, as shown in ~~Figure 2~~ Figures 2A-2B. In this variation, the corresponding preamplifier in the host 8-channel MR system would no longer be needed. In addition, the invention herein disclosed may be used with the existing 9.X software used with the GEMS Signa® 8-channel 1.5 Tesla MR system.

[76] The tapered birdcage resonator 1000 can take form in various configurations of components and component placement. ~~Figure 2~~ The depiction of Figures 2A-2B, which illustrates a band pass configuration, is for the purpose of illustrating a preferred embodiment and is not to be construed as limiting the invention. In particular, the components alternatively may be selected and placed, in a manner known to those skilled in the art, to create a low pass or high pass configuration of the tapered birdcage resonator 1000.

PAGE 24: Please amend paragraph [79] as directed below.

[79] Figures 12-22 illustrate one type of neurovascular array into which the head coil 1000 of the preferred embodiment can be incorporated. The neurovascular array comprises the head coil section, an anterior neck coil section, a posterior cervical spine (or "C-spine") coil section, and a base section. More particularly, as shown in the exploded views of Figures 13 and 14, the neurovascular array basically includes a housing for each of its coil sections. The head coil section, for example, has an inner and outer housings between which is secured the circuitry of head coil 1000 according to the schematic of ~~Figure 2~~ Figures 2A-2B. Figures 12-14 and 21-22 also show the mirror assembly that connects to the head coil section. Figures 13-14 also show the housing(s) to which the circuitry of the posterior C-spine coil can be secured according to the schematic of Figure 9. The base section upon which the C-spine section is fixed is also illustrated in Figures 12-17. The head coil section is slideably attached to the base section by means of a slider channel assembly and a roller assembly. The slider channel and roller assemblies are best shown in Figures 18-20.